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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/577,723

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Michael Wind

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EXAMINER

GILLESPIE, BENJAMIN

ART UNIT

PAPER NUMBER

1796

NOTIFICATION DATE

DELIVERY MODE

06/15/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/577,723	<b>Applicant(s)</b> WIND ET AL.	
	<b>Examiner</b> BENJAMIN J. GILLESPIE	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☒ Claim(s) 2-15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/02/2006</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Objection*

1. Claims 2-15 are objected to because of the following informalities: The language: "A process according to claim..." is unclear if "a process" listed in claims 2-15 is the same process listed in independent claim 1 - the claims should read "the process according to claim...".

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
3. **Claims 1-17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Paulsen et al (2003/0024639) in view of Hippold et al (2003/0162933) and Duff et al (U.S. Patent 5,382,602).
4. **Regarding claim 1:** Paulsen et al teach a method of producing isocyanate-terminated prepolymer that is the reaction product of (A) asymmetrical diisocyanate, and (B) isocyanate-reactive polymer in the presence of organo-metal catalyst (Abstract; paragraphs 32 and 40). At

Art Unit: 1796

least 95 wt% of the prepolymer preferably consists of an “A:B:A” – perfect prepolymer, which are produced by reacting (B) with a large excess of (A), however, the final prepolymer composition preferably has less than 2 wt% of unreacted diisocyanate monomer – however, Paulsen et al fail to teach how the monomeric diisocyanate levels are obtained or a catalyst deactivation + removal step (Paragraphs 30 and 31).

5. Hippold et al teach the production of isocyanate-terminated prepolymers having reduced monomeric diisocyanate content, wherein said prepolymer is the reaction product of (A) diisocyanate and (B) isocyanate-reactive polymer (Abstract). Specifically, paragraph 25 teaches diisocyanate monomer contents as low as 0.1 wt% can be obtained by subjecting the prepolymer to a distillation step.

6. Therefore, it would be obvious to subject the prepolymer of Paulsen et al to the same distillation step since Paulsen et al requires a low monomeric diisocyanate content while at the same time requires the ‘perfect prepolymer’ to be produced using an excess of unreacted diisocyanate, which would thereby result in excess monomer even after the prepolymer is formed. Therefore, a removal step is critical in obtaining the preferred low monomeric diisocyanate of Paulsen et al. However, there is still no mention of a catalyst deactivation or removal step.

7. Therefore, applicants’ attention is directed to paragraph 20 of Paulsen et al, which states that the use of unsymmetrical diisocyanate, specifically diphenylmethane-2,4’-diisocyanate (2,4’-MDI), is preferred because the resulting prepolymer has the isocyanate-group in the 2-position. Having sterically hindered isocyanate groups is preferred since it reduces the reactivity of the prepolymer – i.e. storage stability is preferred.

Art Unit: 1796

8. Duffy et al go on to teach that isocyanate + isocyanate-reactive systems can be further stabilized by the deactivation of organo-metallic catalyst (Abstract; col 4 lines 38-46).

Therefore, it would have also been obvious to deactivate and remove the catalyst present in Paulsen et al since this deactivation would also help enhance storage stability by further reducing the reactivity of the isocyanate-functional prepolymer. Furthermore, it would be obvious to deactivate the catalyst prior to removing the monomeric diisocyanate since it would allow for a more efficient process of removing the diisocyanate + catalyst in one step.

9. **Regarding claim 2:** Paulsen et al teach asymmetrical diisocyanate comprising isophorone diisocyanate (IPDI) and toluene-2,4'-diisocyanate (2,4'-TDI).

10. **Regarding claim 3:** Paulsen et al fail to teach 2,4'-MDI, nevertheless it would be obvious to include it since Hippold et al teach it as the preferred asymmetrical diisocyanate (Hippold et al; paragraph 20).

11. **Regarding claim 4:** The catalyst of Paulsen et al may be zirconium (IVa), tin (IVb), bismuth (Vb) (Paragraph 40). Furthermore, it would be obvious to also include catalyst based on iron or cobalt (VIII) since they are disclosed by Hippold et al for being useful in the production of analogous prepolymer (Hippold et al: paragraph 23).

12. **Regarding claims 5-9:** Although Paulsen et al give a general teaching for organo-metallic catalyst, there is no mention of specific compounds. Nevertheless, as discussed in paragraph 11, it would be obvious to include the catalysts of Hippold et al in Paulsen et al since they are useful in producing analogous prepolymer having reduced monomeric diisocyanate contents. Said catalyst comprises dibutyltin dilaurate – dilaurate is a carboxylate anion chelating system.

Art Unit: 1796

13. Additionally, Duffy et al teach organo-metallic catalyst useful in isocyanate + isocyanate-reactive compound reactions are dimethyltin dilaurate, dibutyltin maleate (Col 4 lines 38-46).

Therefore, it would have been obvious to also include these catalyst since one would reasonably expect them to also promote the (A) isocyanate + (B) isocyanate-reactive compound reaction of Paulsen et al since (A) and (B) of Duffy et al are the same as Paulsen et al (Col 2 lines 41-60, col 3 lines 39-51). Furthermore, Duffy et al show in the examples that the catalyst is in the same phase as the reactants – i.e. a homogenous catalyst system.

14. **Regarding claims 10 and 11:** It would have been obvious to utilize a heterogeneous catalyst/catalyst on a support since it would allow the user to more easily removed said catalyst from the reaction system after the formation of the prepolymer, which as discussed in paragraph 8 and 9 – is preferred to preserve storage stability.

15. **Regarding claim 16:** As discussed in paragraph 5, the prepolymer is preferably at least 95 wt% of A:B:A perfect prepolymer having less than 2 wt% of monomeric diisocyanate.

16. **Regarding claims 12-15 and 17:** As previously discussed in paragraphs 7-9, it would be obvious to deactivate the catalyst of Paulsen et al after the prepolymer is produced, however, Paulsen et al fail to teach catalyst deactivators. Therefore, applicants' attention is again directed to column 4 lines 38-46 of Duffy et al which teach catalyst deactivators consist of acids such as tartaric acid and hydrochloric acid. Therefore it would be obvious to arrive at claims 12-15 and 17 since Duffy et al teach these compounds as the useful deactivators for the relied upon organo-metallic catalyst.

### ***Conclusion***

Art Unit: 1796

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BENJAMIN J. GILLESPIE whose telephone number is (571)272-2472. The examiner can normally be reached on 8am-5:30pm.

18. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

19. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Benjamin J Gillespie/  
Examiner, Art Unit 1796

/Vasu Jagannathan/  
Supervisory Patent Examiner, Art Unit 1796